



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/322,283	05/28/1999	DAVID L. ROLLINS	12-0895	7766

7590

04/09/2002

PATENT COUNSEL
TRW INC
SPACE & ELECTRONICS GROUP
ONE SPACE PARK E2 6072
REDONDO BEACH, CA 90278

EXAMINER

SEDIGHIAN, REZA

ART UNIT

PAPER NUMBER

2633

DATE MAILED: 04/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

cd

Office Action Summary

Application No.

09/322,283

Applicant(s)

ROLLINS, DAVID L.

Examiner

M. R. Sedighian

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 1999.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 May 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2633

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "the bias control circuit that includes a pair of photodetectors and a wavelength division multiplexer", and "means for dithering the Mach-Zehnder modulator bias voltage" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 3-4 and 16-17 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specification discloses the bias control circuit 50 is a low frequency copy of the demodulator 56 and thus includes a WDM, a pair of photodetectors and a summing junction (P. 9, lines 4-6). Specification does not clearly describe how the bias control circuit 50 controls the modulator by using a WDM, a pair of photodetectors and a summing junction. Therefore, the specification fails to enable a person skilled in the art to make and use the claimed invention as recited in claims 3-4 and 16-17.

Art Unit: 2633

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 3-4, 6, and 16-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 3 and 16, it is not clear what is meant by "... said bias control circuit includes a pair of photodetectors and a wavelength division multiplexer". Specification discloses (P. 9, lines 4-6) the bias control circuit 50 includes a WDM, a pair of photodetectors and a summing junction. It is not clear how the bias control circuit controls the optical modulator by using a pair of photodetectors and a wavelength division multiplexer.

As to claims 4 and 17, it is not clear what is meant by "... said WDM and said pair of photodetectors are coupled to said output port of said Mach-Zehnder modulator. Specification discloses (P. 9, lines 4-6) a bias control circuit 50 that includes a WDM and a pair of photodetectors, and figure 4 shows the bias control circuit 50 at an input port of the Mach-Zehnder modulator 20. Accordingly, the bias control circuit 50 that includes a WDM and a pair of photodetectors, is applied to the input of the modulator.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2633

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 1-2, 5, 10-11, 13-15, and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Burns et al. (US patent No: 5,917,970).

Regarding claims 1, 10, 13-14, and 22-24, Burns discloses an optical transmitter (10, 12, fig. 1), comprising: a Mach-Zehnder optical modulator (32, figs. 1, 2a) having an RF input port (35a, fig. 1, 2a), a bias voltage input port (37, fig. 2a), an optical carrier input port (28, figs. 1, 2a), an output port (36, figs. 1, 2a); a WDM (26, fig. 1) with two input ports (18a, 18b, fig. 1) and an output port (28, fig. 1), wherein the output port (28, fig. 1) is coupled to the optical carrier input port of the modulator (col. 1, lines 45-52), and two optical carriers sources (14a, 14b, fig. 1) of different wavelengths (col. 2, line 19-25) are coupled to the input of the WDM (col. 1, lines 35-47). As to claims 10, and 13-14, Burns further discloses an optical receiver (56, fig. 1) and an optical link (54, fig. 1) connecting the transmitter (12, fig. 1) to the receiver (56, fig. 1).

Regarding claims 2 and 15, Burns further discloses a bias control circuit coupled to the bias voltage input port (col. 2, lines 51-55).

Regarding claim 5, Burns further discloses two optical carrier sources are provided by lasers of different wavelengths (col. 2, lines 20-25).

Regarding claim 11, Burns further discloses the optical link is a fiber (col. 3, lines 62-67).

Art Unit: 2633

8. Claims 1-2, 5-6, 8-11, 13-15, and 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Ackerman (Linearization of a Broadband Analog Optical Link Using Multiple Wavelengths, Microwave Photonics, 1998).

Regarding claims 1, 10, 13-14, and 22-24, Ackerman discloses an optical transmitter (fig. 2), comprising: a Mach-Zehnder optical modulator (MZ, fig. 2) having an RF input port (V_{RF} , fig. 2), a bias voltage input port (V_{bias} , fig. 2), an optical carrier input port (figs. 2), an output port (figs. 2); a WDM with two input ports and an output port (WDM, fig. 2), and two optical carriers sources of different wavelengths (1320 nm Laser, 1550 nm Laser, fig. 2). As to claims 10-11, and 13-14, Ackerman further discloses an optical receiver (P. 45, 5th paragraph and fig. 2) and an optical link (P. 45, 5th paragraph).

Regarding claims 2 and 15, Ackerman further discloses a bias control circuit coupled to the bias voltage input port (V_{bias} (control), fig. 2).

Regarding claim 5, Ackerman further discloses two optical carrier sources are provided by lasers of different wavelengths (1320 nm, 1550 nm, fig. 2).

Regarding claim 6, Ackerman further discloses means for dithering the MZM bias voltage (V_{bias} , fig. 2).

Regarding claim 8, Ackerman further discloses a demodulator (fig. 2) comprising: a WDM for separating the wavelengths (WDM, fig. 2), a plurality of photodetectors (P. 45, 5th paragraph and fig. 2), and a summing junction (RF Coupler, fig. 2).

Regarding claim 9, Ackerman further discloses an optical amplifier (fig. 2).

Regarding claim 11, Ackerman further discloses the optical link is a fiber (P. 45, 5th paragraph).

Art Unit: 2633

9. Claims 8-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Fee (US patent No: 5,995,256).

Regarding claim 8, Fee discloses an analog demodulator (col. 3, lines 17-23), comprising: a wavelength division demultiplexer (542, fig. 5), a plurality of photodetectors (PD₁, PD₂, fig. 5), and a summing junction (560, fig. 5) for summing the outputs of the photodetectors (col. 9, lines 60-67).

Regarding claim 9, Fee further discloses an optical amplifier (col. 6, lines 1-7 and 535, fig. 5).

10. Claims 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Kintis et al. (US patent No: 5,661,582).

Regarding claims 10-11, Kintis discloses an optical transmitter (48, fig. 2) including an optical modulator (54, fig. 2) for modulating an RF input signal (RF Input, fig. 2) onto an optical carrier (λ_1 , fig. 2), an optical receiver (72, 76, fig. 2) for demodulating the RF modulated optical signal and providing an RF output signal (col. 5, lines 50-55 and RF Output, fig. 2), and an optical fiber link (30, fig. 2) connecting the transmitter (48, fig. 2) and the receiver (72, fig. 2).

11. Claims 10 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Dishman et al. (US patent No: 6,271,953).

Regarding claims 10 and 12, Dishman discloses an optical transmitter (14a, fig. 1B) including an optical modulator (36, fig. 1B) for modulating an RF input signal (IF, fig. 1B) onto an optical carrier (LO, fig. 1B), an optical receiver (14b, fig. 1B) for demodulating (78, fig. 1B)

Art Unit: 2633

the RF modulated optical signal and providing an RF output signal (FDM in 14b, fig. 1B).

Dishman further discloses the communication is in free space (col. 5, lines 1-9).

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burns et al. (US patent No: 5,917,970) in view of Dishman et al. (US patent No: 6,271,953), or Franck et al. (US patent No: 6,188,497).

Regarding claim 7, Burn differ from the claimed invention in that Burns does not disclose an optical amplifier coupled at the output of modulator. Dishman discloses an optical modulator (36, fig. 1B) and an optical amplifier (40, fig. 1B) at the output of modulator. Franck discloses an optical modulator (162, fig. 16) and an optical amplifier (163, fig. 16) at the output of modulator. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate an optical amplifier such as the one of Dishman or Franck at the output of optical modulator in the optical transmission system of Burns in order to boost the light signals that become attenuated during the transmission and to improve the overall transmission performance and increasing the transmission distance.

14. Claims 3-4, 6, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ackerman (Linearization of a Broadband Analog Optical Link Using Multiple Wavelengths, Microwave Photonics, 1998) in view of Yao (US patent No: 5,917,179).

Regarding claims 3-4, 6, and 16-17, as it is understood, Ackerman differs from the claimed invention in that Ackerman does not disclose the bias control circuit includes a WDM and a pair of photodetectors. Yao discloses an optical modulator (220, fig. 7A) with a feedback control circuit (col. 11, lines 61-67, col. 12, lines 1-8 and 720, 250, fig. 7A) that includes a coupler (710, fig. 7A) and a pair of photodetectors (724, 256, fig. 7A). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a control circuit that includes a coupler and a pair of photodetectors such as the one of Yao for the modulator bias control circuit in the transmission system of Ackerman in order to provide a control circuit that can monitor the optical output of the modulator to determine by how much the modulator's transfer response has drifted and to provide a DC bias voltage to maintain the modulator's transfer response at the desired voltage position and to further suppress the quality degradation of the output optical signal.

Ackerman and Yao Regarding claim 18, as it is understood, Ackerman further discloses the optical receiver includes a WDM demultiplexer (WDM, fig. 2), photodetectors ($i_{det,1.3}$, $i_{det,1.55}$, fig. 2), and a summing junction (RF Coupler, fig. 2).

15. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ackerman (Linearization of a Broadband Analog Optical Link Using Multiple Wavelengths, Microwave

Art Unit: 2633

Photonics, 1998) in view of Yao (US patent No: 5,917,179) and in further view of Dishman et al. (US patent No: 6,271,953), or Franck et al. (US patent No: 6,188,497).

Regarding claims 19-21, as it is understood, the modified transmission system Ackerman and Yao further differs from the claimed invention in that Ackerman and Yao do not disclose an optical amplifier coupled to the output of modulator and an optical amplifier coupled to the input of optical receiver. Dishman discloses an optical modulator (36, fig. 1B) and an optical amplifier (40, fig. 1B) at the output of modulator and an optical amplifier (76, fig. 1B) at the input of receiver (78, fig. 1B). Franck discloses an optical modulator (162, fig. 16) and an optical amplifier (163, fig. 16). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate an optical amplifier such as the one of Dishman or Franck at the output of optical modulator, or at the input of optical receiver in the modified optical transmission system of Ackerman and Yao in order to boost the light signals that become attenuated during the transmission and to improve the overall transmission performance and to further increase the transmission distance.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Application/Serial Number: 09/322,283

Page 10

Art Unit: 2633

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.



JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800